

## **USMLE-STEP-3**<sup>Q&As</sup>

United States Medical Licensing Step 3

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#### **QUESTION 1**

A22-year-old male presents to an acute care clinic in order to have two genital lesions evaluated. He first noticed the lesions about 2 weeks ago, but delayed seeking medical care because he believed they were harmless due to the lack of any discomfort. He states that he does engage in unprotected sexual intercourse, with the most recent time being 1 month ago. On examination, the glans penis features two distinct nontender papules with elevated edges surrounding ulcerated craters. They each measure 1 cm in diameter. There is also nontender bilateral inguinal lymphadenopathy.

The drug of choice for treating this patient works by which of the following mechanisms?

- A. interfering with protein synthesis at the ribosome
- B. attaching to sterols in cell membranes
- C. inhibiting bacterial cell wall synthesis
- D. inhibiting the transport of amino acids into bacteria
- E. inhibiting dihydrofolate reductase

Correct Answer: C Section: (none)

#### Explanation:

This patient\\'s presentation is consistent with primary syphilis. Primary syphilis manifests itself usually in the form of solitary or multiple raised, firm papules which eventually erode to form ulcerative craters with raised, indurated margins surrounding the centralized ulcer. These lesions, called chancres, most commonly involve the glans penis in males and the vulva or cervix in females, although they may appear rarely in other areas. Syphilis is caused by the spirochete, T. pallidum, which can be visualized by darkfield microscopy, by silver stain, or by fluorescent antibody microscopy. There is an incubation period of approximately 3 weeks separating the time of initial exposure to T. pallidum and the time of chancre formation. Syphilis is characterized by the presence of latent stages in which there are no signs of clinical disease present. Penicillin is the drug of choice for the treatment of syphilis. In addition to treating patients with diagnosed syphilis, it is recommended that treatment also be administered to all sexual contacts of the past 90 days. It has been demonstrated that up to 30% of asymptomatic sexual contacts of patients with infectious lesions within the past 30 days go on to develop syphilis if left untreated. If left untreated, patients may ultimately develop tertiary syphilis characterized by significant destructive neurologic and cardiovascular symptoms. The mortality rate for untreated tertiary syphilis is approximately 20%.

Cephalosporins and penicillin antibiotics act by interfering with the late stages of bacterial cell wall synthesis, although the precise biochemical reactions are not entirely understood. Peptidoglycan provides mechanical stability to the cell wall because of its high degree of cross-linking with alternating amino pyranoside sugar residues (N-acetylglucosamine and N-acetylmuramic acid). The completion of the cross-linking occurs by the action of the enzyme transpeptidase. This transpeptidase reaction, in which the terminal glycine residue of the pentaglycine bridge is joined to the fourth residue of the pentapeptide (Dalanine) thereby releasing the fifth residue (D-alanine), is inhibited by beta-lactams.

#### **QUESTION 2**

A2-week-old infant is brought to the office for a check-up. The father relates that they have no concerns except that the baby seems to have tearing from his left eye. They also point out some swelling at the edge of his left eye. The infant is eating, sleeping, stooling, and voiding well. On examination, you find a  $1/2 \times 1/2$  cm firm nodule inferior to the medial canthus of the left eye. What does this most likely represent?



- A. dermoid cyst
- B. nasolacrimal duct obstruction
- C. mucocele
- D. accessory lacrimal gland
- E. frontal encephalocele

Correct Answer: B Section: (none)

Explanation:

Relative immaturity of the lacrimal drainage system can result in the accumulation of debris in the nasolacrimal duct. This will manifest as a swelling inferior to the middle canthus. Dermoid cysts in children are commonly found as a subcutaneous nodule on the lateral portion of the eyebrow. Mucoceles are usually found as fleshy papules on the inner portion of the lower lip. Frontal encephaloceles are midline in location.

#### **QUESTION 3**

A mobile mass is found on rectal examination in a 77-year-old male with complaints of blood in his stool. On workup, he is found to have a stage I (Dukes\\' A), well-differentiated adenocarcinoma. The most appropriate intervention is which of the following?

- A. transanal excision
- B. abdominal perineal resection
- C. low anterior resection
- D. placement of endorectal wallstent
- E. neoadjuvant chemotherapy followed by transanal resection

Correct Answer: A Section: (none)

#### Explanation:

Local treatment of rectal cancer is the treatment of choice in selected individuals with low-lying rectal cancers. The lesion must be mobile, nonulcerated, within 10 cm of the anal verge, less than 3 cm in diameter, less that onefourth the circumference of the rectal wall, and stage T1 or T2 on endorectal ultrasound. Transanal excision is the most straightforward technique of local treatment. It entails full thickness excision of the lesion into the perirectal fat with adequate margins. For early lesions into the submucosa only (T1), no adjuvant therapy is required unless poor prognostic features are present on final pathology (poorly differentiated or lymphatic/vascular invasion). If the lesion penetrates the muscular wall (T2), adjuvant radiation therapy with or without chemotherapy is indicated following surgical removal. Overall, the disease free survival rate is 80%.

#### **QUESTION 4**



A 6-month-old male infant presents to your clinic because the mother is concerned that he is not eating well and he has been constipated. The mother tells you that her prenatal course and delivery were uneventful. On physical examination, the infant has a puffy face, large tongue, and persistent nasal drainage The above condition can be caused by a deficiency of which of the following?

A. iron

- B. vitamin C
- C. vitamin D
- D. iodine
- E. cortisol
- Correct Answer: D Section: (none)

#### Explanation:

Hypothyroidism results from inadequate thyroid hormone production or a defect in thyroid hormone receptor activity. Hypothyroidism can be congenital or acquired. Most infants with congenital hypothyroidism are asymptomatic at birth. Feeding difficulties, choking spells, and somnolence often present during the first month of life. Respiratory distress can also occur in part due to the large tongue and nasal obstruction. On physical examination, you may find a large abdomen, umbilical hernias, subnormal temperature, cold skin, murmurs, or bradycardia. Iodine is absorbed in the GI tract as iodide. Iodide is concentrated in the thyroid gland and four atoms are incorporated into each molecule of thyroxine. Profound dietary deficiency of iodine will result in hypothyroidism and is the most common cause of goiter in the world. Rickets results from a deficiency of vitamin D.

This condition predominately affects the long bones and skull. Vitamin C deficiency results in scurvy, a condition with impaired collagen formation. The clinical manifestations may include changes in the gums, loosening of teeth, brittle bones, and swollen joints. Pallor is the most important sign of iron-deficiency anemia. Children may also have the desire to ingest unusual substances such as ice or dirt. Finally, hyponatremia and hypoglycemia are the prominent presenting signs of adrenal insufficiency in infants

#### **QUESTION 5**

A 68-year-old retired male is accompanied by his son and daughter to a family medicine clinic. They are concerned about their father\\'s health, as they have noticed him becoming gradually more "confused" over the past year. While he had always been capable of managing to live alone, he has not been keeping up with his bills. The patient explains that he needs his bifocals, but both of his children quickly interrupt, stating that he has glasses but misplaces them frequently. He also frequently loses his keys and forgets to shut his door. The management of the condominium has complained because they recently found him wandering around the lobby and pool in the middle of the night while dressed in his underwear. He has no medical problems and takes only an aspirin daily. His MSE is significant for defensiveness to questioning with some irritability. His Mini-Mental State Examination is 19/30, with notable memory deficits and wordfinding difficulties.

Which of the following will be the most likely course of his illness?

- A. gradual progression
- B. no worsening
- C. rapid progression



- D. steady improvement
- E. stepwise progression

Correct Answer: A Section: (none)

Explanation: Explanations: This patient presents with a dementia, most likely Alzheimer\\'s type. Although some cases have been found to have a genetic component, genetic testing is not routinely performed. Neuropsychological testing may be used to specify or confirm the presence of cognitive deficits. Cerebrospinal fluid and MRI may be used to ruleout other causes of dementia but are not necessarily used to diagnose Alzheimer\\'s disease. Although dementia of the Alzheimer\\'s type is a clinical diagnosis, the final diagnosis can only be made by a neuropathologic examination, which classically demonstrates senile plaques, neurofibrillary tangles, and neuronal loss. (Synopsis, p. 331) Preferential atrophy of the frontotemporal regions is consistent with Pick\\'s disease, which may present similarly to Alzheimer\\'s disease. Huntington\\'s disease, another cause of dementia, is characterized by a severe movement disorder. It demonstrates striking atrophy of the caudate nucleus along with possible cerebral atrophy. Dilatation of the ventricles without atrophy is the hallmark of NPH, one of the few potentially reversible causes of dementia. The classic triad of NPH is dementia, which is often caused by uncontrolled hypertension. It results in multiple small infarcts of the white matter surrounding the ventricles. Alzheimer\\'s dementia, the most common cause of dementia, is characterized by diffuse cerebral atrophy and dilatation of the ventricles.

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